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FORM PTO-1390 (REV. 5-93)	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER 1947/25
<b>TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371</b>		U.S. APPLICATION NO. (If known, see 37 CFR 1.5)  <div style="font-size: 1.5em; font-weight: bold;">10/069587</div>
INTERNATIONAL APPLICATION NO. PCT/US00/22391	INTERNATIONAL FILING DATE (15.08.00) 15 August 2000	PRIORITY DATES CLAIMED (27.08.99) 27 August 1999
TITLE OF INVENTION <b>ADJUSTABLE KEYBOARD WITH ADJUSTING AND LOCKING MECHANISM, AND METHOD OF ITS USE</b>		
APPLICANT(S) FOR DO/EO/US <b>GOLDSTEIN, Mark R., SKOSKIEWICZ, Andrzej; JUE, Clifford and LAW, David John</b>		
Applicants herewith submit to the United States Designated/Elected Office (DO/EO/US) the following items and other information		
<ol style="list-style-type: none"> <li>1. <input checked="" type="checkbox"/> This is a <b>FIRST</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li>2. <input type="checkbox"/> This is a <b>SECOND</b> or <b>SUBSEQUENT</b> submission of items concerning a filing under 35 U.S.C. 371.</li> <li>3. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) immediately rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).</li> <li>4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.</li> <li>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2))           <ol style="list-style-type: none"> <li>a. <input type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau).</li> <li>b. <input checked="" type="checkbox"/> has been transmitted by the International Bureau.</li> <li>c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</li> </ol> </li> <li>6. <input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)).</li> <li>7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))           <ol style="list-style-type: none"> <li>a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau).</li> <li>b. <input type="checkbox"/> have been transmitted by the International Bureau.</li> <li>c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired.</li> <li>d. <input checked="" type="checkbox"/> have not been made and will not be made.</li> </ol> </li> <li>8. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</li> <li>9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</li> <li>10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</li> </ol>		
<b>Items 11. to 16. below concern other document(s) or information included:</b>		
<ol style="list-style-type: none"> <li>11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</li> <li>12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</li> <li>13. <input type="checkbox"/> A <b>FIRST</b> preliminary amendment.</li> <li style="padding-left: 20px;"><input type="checkbox"/> A <b>SECOND</b> or <b>SUBSEQUENT</b> preliminary amendment.</li> <li>14. <input type="checkbox"/> A substitute specification.</li> <li>15. <input type="checkbox"/> A change of power of attorney and/or address letter.</li> <li>16. <input checked="" type="checkbox"/> Other items or information: An International Search Report; International Preliminary Examination Report.</li> </ol>		

3. APPLICATION NO. if known, see  
/ C.F.R. 1.5

INTERNATIONAL APPLICATION NO.  
PCT/US00/22391

ATTORNEY'S DOCKET NUMBER  
1947/25

17. ☒ The following fees are submitted:

**Basic National Fee (37 CFR 1.492(a)(1)-(5)):**

Search Report has been prepared by the EPO or JPO ..... \$890.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) ... \$710.00

No international preliminary examination fee paid to USPTO (37 CFR 1.482) but  
international search fee paid to USPTO (37 CFR 1.445(a)(2)) ..... \$740.00

Neither international preliminary examination fee (37 CFR 1.482) nor international  
search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$1,040.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) and all  
claims satisfied provisions of PCT Article 33(2)-(4) ..... \$100.00

**ENTER APPROPRIATE BASIC FEE AMOUNT =** \$ 890.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months  
from the earliest claimed priority date (37 CFR 1.492(e)).

\$

Claims	Number Filed	Number Extra	Rate		
Total Claims	49 - 20 =	29	X \$18.00	\$ 522.00	
Independent Claims	4 - 3 =	1	X \$84.00	\$ 84.00	
Multiple dependent claim(s) (if applicable)			+ \$280.00		

**TOTAL OF ABOVE CALCULATIONS =** \$1,496.00

Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must  
also be filed. (Note 37 CFR 1.9, 1.27, 1.28).

\$ 748.00

**SUBTOTAL =** \$ 748.00

Processing fee of \$130.00 for furnishing the English translation later the ☐ 20 ☐ 30  
months from the earliest claimed priority date (37 CFR 1.492(f)).

\$

**TOTAL NATIONAL FEE =** \$ 748.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be  
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property

\$

**TOTAL FEES ENCLOSED =** \$ 748.00

Amount to be:  
refunded

\$

charged \$ 748.00

a. ☐ A check in the amount of \$\_\_\_\_\_ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. 11-0600 in the amount of **\$748.00** to cover the above fees. A duplicate copy of this  
sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit  
Account No. 11-0600. A duplicate copy of this sheet is enclosed.

**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must  
be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

  
SIGNATURE

Kenyon & Kenyon  
One Broadway  
New York, New York 10004  
CUSTOMER NO. 26646

Laleh Jalali (Reg. No. 40,031)  
NAME

DATE

02-27-02

**ADJUSTABLE KEYBOARD WITH ADJUSTING AND LOCKING  
MECHANISM, AND METHOD OF ITS USE**

**BACKGROUND OF THE INVENTION**

**FIELD OF THE INVENTION**

The following invention relates to keyboards, and more particularly to a keyboard formed in two or more mutually pivotable segments which may be adjusted  
5 and locked into a number of different ergonomic positions.

**DESCRIPTION OF THE PRIOR ART**

Known keyboards of the type used at a computer terminal, for example, generally include a unitary board onto which alphanumeric keys are attached. It is a  
10 disadvantage of such known keyboards that the wrists and/or arms and shoulders of an operator must be contorted into a configuration which is stressful to the user after prolonged use of the keyboard. This problem is brought about by the fact that the hands of the user must be turned outwardly by pivoting of the wrists relative to the forearms, resulting in ulnar deviation. Discomfort to the user  
15 caused by pronation of the wrists is also a problem with these known keyboards. Pronated posture can also transmit stresses into the neck and shoulders of the user.

It is desirable to reduce pronation and ulnar deviation of the wrists in computer keyboards. To that end, U.S. Patent Nos. 5,424,728 and 5,543,790 describe adjustable keyboards with at least two segments which are movable relative to one another via a  
20 hinge or joint. By moving the segments, the orientation of the user's wrists and hands

can be adjusted to allow for reduction of ulnar deviation and pronation of the wrists. The hinge or joint in those patents is disclosed as preferably being a ball and socket-type joint.

U.S. Patent Nos. Des. 362,434 and 5,454,652, assigned to Lexmark and U.S. Patent No. 5,527,116, assigned to Maxi Switch, each show adjustable keyboards including a mechanism for locking the keyboard segments in place. However, in each of the keyboards described in those patents, the locking mechanism includes a large number of parts. As a result, those keyboards can be difficult to manufacture and assemble and therefore can be expensive, and those keyboards can be difficult for the user to adjust and lock.

#### SUMMARY OF THE INVENTION

It is the object of the present invention to overcome or substantially ameliorate the disadvantages of the prior art. It is therefore an object of the present invention to provide an adjustable keyboard which is inexpensive and simple to manufacture, is made of few parts and parts which are easy to manufacture and assemble, and which is easy for the user to adjust to a large number of positions.

There is disclosed a keyboard having a plurality of keys, the keyboard having at least two segments which are mutually movable relative to one another, and wherein each segment of the keyboard includes some of the keys. Typically, the keyboard has at least two mutually pivotable segments which are attached to one another at a top end of the keyboard segments by way of a hinge or joint, such that a front edge of the keyboard may spread apart in at least a substantially horizontal plane, to thereby reduce ulnar deviation in the keyboard user. Advantageously, the hinge or joint is adapted to allow pivoting in both horizontal and vertical planes such that the two segments of the keyboard may reside in different planes, so that the center of the keyboard is raised to reduce pronation and therefore decrease tension in the wrists and forearms of the user.

The hinge or joint may preferably be composed of a ball and socket joint which includes a locking mechanism. The locking mechanism may be fashioned using a pivoting handle, in the form of a lever, which includes a cam. The cam may

be used to force bearing surfaces against a ball on a ball element, to thereby frictionally retain the ball and socket joint in a fixed position. Upon pivoting of the handle away from the keyboard, the cam may release the ball from the friction fit with the bearing surfaces, thereby allowing the ball to slide in the socket, and therefore  
5 allowing the keyboard segments to be adjusted relative to one another.

A support may be provided generally below the ball and socket joint so as to maintain the central region of the keyboard at a raised preselected level, if needed.

Beneficially, a number pad region of the keyboard can be provided which is pivotable relative to one of the segments such that the number pad region may reside  
10 in a plane other than the plane of the segment to which the number pad is hinged.

Typically, the keyboard is divided into segments which coincide with generally accepted keyboard areas used by a particular hand.

The present invention provides a keyboard in which the wrists of the operator need not be contorted as they would be in use of a conventional keyboard.

15 In order to electrically connect the keys of one segment of the keyboard to the other, a cable or any suitable contact may be provided between the two segments. Additionally, an infrared or other electromagnetic signal may be used to transmit signals from the keyboard to the computing device without the need for a cable or other physical connection.

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#### **BRIEF DESCRIPTION OF THE DRAWINGS**

Preferred forms of the present invention will now be described by way of example with reference to the accompanying drawings, wherein:

- FIG. 1 is a schematic plan view of a keyboard of the present invention;  
25 FIG. 2 is a schematic elevational view of the keyboard of FIG. 1;  
FIG. 3 is an exploded perspective view of the components of an embodiment of the hinge or joint and locking mechanism of the present invention;  
FIG. 3a is a cross-sectional view, through line IIIA-IIIA, of the cam of the embodiment of FIG. 3.

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## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention relates to a keyboard **1** to be used, for example, at a computer terminal **12**. In the accompanying drawings there is schematically depicted a keyboard generally indicated by reference numeral **1**. Keyboard **1** includes separate segments **2**, **3**, and **4**, each having a plurality of keys **5**. It is to be understood that the configuration of the keys on segments **2**, **3**, and **4**, may be in any suitable form which allows access to the appropriate hand corresponding to segments **2**, **3**, and **4**, and need not be the configuration shown in FIG. 1.

Segments **2** and **3** of keyboard **1** are mutually attached by a hinge or joint **6**, which may provide one or more degrees of freedom of relative movement between segments **2** and **3**. Hinge or joint **6** in the preferred embodiments is described in more detail below. As described in more detail below, a handle **100**, in the form of a lever, forms a portion of a keyboard locking mechanism. The handle **100** may be pivoted from a locked position, which fixes the position of the hinge or joint **6**, to an unlocked position **100'** (dashed lines), which allows pivoting movement of the segments **2**, **3** relative to one another in one or more planes. The segment **2** or **3** containing the handle **100** may include an indentation **110** near the end of the handle **100** to allow easier access to, and pivoting of, the handle **100** by the user.

Segment **4** of keyboard **1**, if provided, has mounted thereon numerical keys **5** and is attached to segment **3** by hinge or joint **7**. Hinge or joint **7** may extend along line **8** illustrated in FIG. 1 so as to provide at least one degree of relative movement between segments **3** and **4**. Alternatively, a hinge or joint of the type described below may be employed between segments **2** and **3** and may be located at either an upper or lower end of line **8** in FIG. 1. Segment **4** is an optional segment, and the keyboard **1** may be formed of only segments **2** and **3**.

It should be appreciated that segments **2** and **3** of keyboard **1** may pivot with respect to one another while each remaining in a single plane (i.e., the plane of FIG. 1), or in multiple planes (i.e., the planes of FIGS. 1 and 2). Movement of the segments **2**, **3** in the plane of FIG. 1 acts to prevent or reduce ulnar deviation of the user's hands and wrists, while movement of the segments **2**, **3** in the plane of FIG. 2 acts to prevent or reduce pronation of the user's wrists. As depicted in FIG. 2, a center

region of keyboard **1** is raised above the level of a desk **14** on which the keyboard **1** is supported. An optional support (not shown) may be provided generally below the hinge or joint **6** so as to maintain the central region of the keyboard **1** at a raised preselected level, if needed.

5           Should an operator of the keyboard **1** not be comfortable with a hinged-apart orientation of the keyboard **1**, the keyboard **1** may simply be returned to a conventional configuration.

          In order to electrically connect the keys of one segment (e.g. segment **2**) to the other (e.g. segment **3**), a cable **10** or any suitable contact may be provided  
10       between the two segments. Additionally, an infrared or other electromagnetic signal may be used to transmit signals from the keyboard to the computing device without the need for a cable or other physical connection.

          FIG. 3 shows an exploded view of the components of a first embodiment of a locking mechanism and hinge or joint of the present invention. A handle **100**, in the  
15       form of a lever, includes a handle section **101** at one end and a cam **102** at another end. Cam **102** includes a cam surface **103**. On either side of cam **102** are flanges **104**, each of which includes a hole **105**. A cam hole **107** passes through cam **102** and is aligned with holes **105**. Handle **100** is preferably made of an inexpensive, but relatively rigid, material such as an engineering plastic such as polyketon, sold under  
20       the trade name CARILON.

          A retaining pin **200** passes through holes **105** and the cam hole **107**, to retain handle **100** on socket element **700**. Pin **200** is preferably manufactured of an inexpensive and somewhat resilient material, such as an engineering plastic, for example a glass-filled polyamide or nylon, sold under the trade name GRIVORY GV-  
25       5H, and has at least one end which is slightly enlarged, so as to allow a press or interference fit between the pin **200** and holes **105**, to thereby hold handle **100** and socket element **700** together. Flanges **701** on socket element **700** fit slidingly within slots **106** between flanges **104** and cam **102**, such that pin **200** fits through holes **105**, holes **702** on flanges **701**, and the cam hole **107**, thereby allowing pivoting of handle  
30       **100** relative to socket element **700** about the axis of pin **200**.

          A camming pin **300** is retained adjacent to the cam **102**. Camming pin **300**

includes a camming surface **301** and a pin **302** projecting away from camming surface **301**. Pin **302** fits through holes **401** and **501** in biasing element **400** and bearing element **500**, respectively, such that bearing element **500**, biasing element **400** and camming pin **300** are connected and aligned together. Camming pin **300** is preferably made of an inexpensive, but relatively rigid, material such as an acetal co-polymer or nylon, sold under the trade name DURACON —90.

A biasing element **400** is retained adjacent to the locking pin **300**. The biasing element is preferably disc-shaped, and includes a hole **401** passing through its center. Biasing element **400** is preferably made of a relatively resilient material, such as a urethane rubber, or could be made of a spring steel component, so that it acts as a spring to provide a bias against the action of cam **102** during locking and unlocking. The biasing element **400** serves to reduce the need for exacting tolerances in the locking mechanism of the present invention. The biasing element **400** also serves as a clutching mechanism so that if too much pressure is exerted on the keyboard segments **2, 3**, the provision of the biasing element **400** allows for slippage between the ball element **600** and socket element **700** described below.

A bearing element **500** is retained adjacent to the biasing element **400**. On the end of bearing element **500** adjacent to the biasing element **400**, the bearing element **500** includes a hole **501**, through which the end of pin **302** passes. The opposite end of bearing element **500** includes a bearing surface **502** which is preferably hemispherical in shape. The bearing element **500** is mounted within socket element **700** for sliding movement relative to both the keyboard segments **2, 3**. The bearing element **500** is preferably made of a relatively inexpensive and rigid material, such as an acetal copolymer, sold under the trade name DURACON M-90.

A ball element **600** is mounted adjacent to the bearing element **500**. A ball **601** on ball element **600** fits within, and is slidably mounted against, bearing surface **502**. A shaft **602** connects ball **601** to a retaining portion **603** of ball element **600**. Retaining portion **603** may include one or more holes **604**, which are used to affix ball element **600** to one of the keyboard segments **2, 3** or **4**, via suitable attachment mechanisms such as screws or bolts. The ball element **600**, although shown as spherical in the drawings, could alternatively be hemispherical in shape. The ball



element 600 is preferably made of a relatively inexpensive and rigid material, such as a glass or mineral filled acetal copolymer, or alternatively could be fabricated of stainless steel. In an alternative embodiment of the invention, the cam surface 103 may provide direct contact with the ball element 600, thereby eliminating the need for the bearing element 500 and biasing element 400.

Ball 601 fits within a socket element 700, such that the shaft 602 and retaining portion 603 project out of an opening 706 in socket element 700. An interior bearing surface of socket element 700, at socket end 705, is hemispherical in shape. Ball 601 on ball element 600 fits within, and is slidably mounted against, the bearing surface within socket end 705. Socket element 700 includes flanges 701, which are spaced and shaped so as to slidably fit within slots 106 on handle 100. Holes 702 on flanges 701 are spaced to align with holes 105 on handle 100, and the cam hole on handle 100, so that the pin 200 can fit through those holes, allowing the handle 100 to be pivoted relative to socket element 700. Socket element 700 may also include a flange 703 with one or more holes 704, which are used to affix socket element 700 to one of the keyboard segments 2, 3 or 4 -- adjacent the segment 2, 3 or 4 to which ball element 600 is affixed -- via suitable attachment mechanisms such as screws or bolts. The socket element 700 is preferably made of a relatively inexpensive and rigid material, such as a glass or mineral filled acetal copolymer, or alternatively could be fabricated of metal.

Operation and manipulation of the keyboard 1 of the present invention will now be described. When it is desired to set a new position of the keyboard 1 segments 2 and 3 relative to one another, the handle 100 is pivoted to its unlocked position 100'. Pivoting of the handle 100 is accomplished by rotating handle 100 about pin 200, thereby moving cam 102 relative to camming surface 301. In the unlocked position 100', the cam surface 103 is spaced a shorter distance  $d_1$  from the axis of pin 200 than the distance  $d_2$  of cam surface 103 from the axis of pin 200 in the locked position. As a result, in the locked position, the cam 102 pushes the camming pin 300 in the direction of the ball element 600, and in the unlocked position 100', the cam 102 allows camming pin 300 a degree of movement away from ball element 600, under the influence of biasing element 400.

In the unlocked position **100'** the bias of biasing element **400** allows camming pin **300** to move in the direction away from ball element **600**. This movement also allows movement of the bearing element **500** away from the ball element **600**. As a result, the ball **601** is unclamped between the bearing surface **502** and the bearing surface inside the socket end **705**, allowing the ball **601** to rotate between those surfaces. Rotation of the ball **601** is effected by pivoting movement, in one or more planes, of the segments **2, 3** relative to one another, one of the segments **2, 3** being affixed to the retaining portion **603** projecting out of opening **706** in socket element **700**, and the other segment **2, 3** being affixed to socket element **700**.

When the segments are unlocked by moving handle **100** to unlocked position **100'**, the segments **2, 3** may be pivoted in a horizontal plane (i.e., the plane of FIG. 1) relative to one another to reduce or eliminate ulnar deviation in the user's hands and wrists. The segments **2, 3** may also be pivoted in a vertical plane (i.e., the plane of FIG. 2) relative to one another to reduce or eliminate pronation in the user's wrists.

After a desired orientation of the segments **2, 3** relative to one another is achieved, the handle **100** is pivoted around pin **200** to its locked position, thereby moving cam **102** relative to camming surface **301**. In the locked position, the cam surface **103** is spaced a longer distance  $d_2$  from the axis of pin **200** than the distance  $d_1$  of cam surface **103** from the axis of pin **200** in the unlocked position. As a result, in the locked position, the cam **102** pushes the camming pin **300** in the direction of the ball element **600**. In the locked position, the camming pin **300** moves in the direction toward ball element **600**. This movement pushes the biasing element **400**, and thus the bearing element **500**, toward the ball element **600**. As a result, the ball **601** is clamped between the bearing surface **502** and the bearing surface inside the socket end **705**, fixing the ball **601** against rotation between those surfaces as the result of frictional forces. The segments **2, 3** are thus fixed in position relative to one another, as a result of the clamping of ball **601** between the bearing surface **502** and the bearing surface inside the socket end **705**, as well as fixing of one of the segments **2, 3** to the retaining portion **603** and the other segment **2, 3** to socket element **700**.

While the forgoing represents a description of preferred embodiments of the invention, it is to be understood that the claims below recite the features of the present



**CLAIMS**

What is claimed is:

1. A keyboard comprising:
  - a first keyboard segment, the first keyboard segment including keys;
  - a second keyboard segment, the second keyboard segment including keys; and
  - a joint coupling the first keyboard segment and the second keyboard segment, the joint allowing movement of the first keyboard segment and the second keyboard segment relative to one another, the joint including a locking mechanism, the locking mechanism locking a position of the first keyboard segment relative to the second keyboard segment, the locking mechanism including a cam.
2. The keyboard of claim 1, wherein:
  - the locking mechanism includes a lever movable from a locking position to an unlocking position, the lever moving the cam.
3. The keyboard of claim 2, wherein:
  - the lever is pivotally mounted on a pin.
4. The keyboard of claim 1, wherein:
  - the locking mechanism includes a bearing element, the cam being connected to the bearing element, movement of the cam causing movement of the bearing element.
5. The keyboard of claim 4, wherein:
  - the joint includes a ball, the bearing element engaging the ball in a locked position to lock the first segment relative to the second segment.

6. The keyboard of claim 1, wherein:  
the joint is a ball-and-socket joint.
7. The keyboard of claim 1, wherein:  
the locking mechanism includes a biasing element, the biasing element  
biasing the cam and lever.
8. The keyboard of claim 1, wherein:  
the joint includes a ball, the ball being affixed to one of the keyboard  
segments.
9. The keyboard of claim 8, wherein:  
the cam directly contacts the ball.
10. The keyboard of claim 8, wherein:  
the ball is hemispherical.
11. The keyboard of claim 1, wherein:  
the joint includes a socket element, the socket element being affixed to  
one of the keyboard segments.
12. The keyboard of claim 11, wherein:  
the joint includes a ball, the ball being affixed to another of the  
keyboard segments.
13. The keyboard of claim 1, wherein:  
the locking mechanism includes a movable bearing element.
14. The keyboard of claim 13, wherein:  
the movable bearing element has a hemispherical surface.

15. The keyboard of claim 1, wherein:  
the first keyboard segment and the second keyboard segment are positionable relative to one another to reduce pronation of a user's wrists.
16. The keyboard of claim 1, wherein:  
the first keyboard segment and the second keyboard segment are positionable relative to one another to reduce ulnar deviation of a user's wrists.
17. The keyboard of claim 1, wherein:  
the joint is adapted to allow pivoting of the first keyboard segment and the second keyboard segment in both horizontal and vertical directions.
18. A keyboard comprising:  
a first keyboard segment, the first keyboard segment including keys;  
a second keyboard segment, the second keyboard segment including keys; and  
a joint coupling the first keyboard segment and the second keyboard segment, the joint allowing movement of the first keyboard segment and the second keyboard segment relative to one another, the joint including a locking mechanism, the locking mechanism locking a position of the first keyboard segment relative to the second keyboard segment, the locking mechanism including a lever movable from a locking position to an unlocking position.
19. The keyboard of claim 18, wherein:  
the locking mechanism includes a bearing element and a cam, the cam being connected to the bearing element, movement of the cam causing movement of the bearing element.

20. The keyboard of claim 18, wherein:  
the joint includes a ball and a bearing element, the bearing element engaging the ball in the locked position to lock the first segment relative to the second segment.
21. The keyboard of claim 18, wherein:  
the joint is a ball-and-socket joint.
22. The keyboard of claim 19, wherein:  
the locking mechanism includes a biasing element, the biasing element biasing the cam and lever.
23. The keyboard of claim 18, wherein:  
the joint includes a ball, the ball being affixed to one of the keyboard segments.
24. The keyboard of claim 23, further comprising:  
a cam, the cam directly contacting the ball.
25. The keyboard of claim 23, wherein:  
the ball is hemispherical.
26. The keyboard of claim 18, wherein:  
the joint includes a socket element, the socket element being affixed to one of the keyboard segments.
27. The keyboard of claim 26, wherein:  
the joint includes a ball, the ball being affixed to another of the keyboard segments.

28. The keyboard of claim 18, wherein:  
the locking mechanism includes a movable bearing element.
29. The keyboard of claim 28, wherein:  
the movable bearing element has a hemispherical surface.
30. The keyboard of claim 18, wherein:  
the first keyboard segment and the second keyboard segment are  
positionable relative to one another to reduce pronation of a user's wrists.
31. The keyboard of claim 18, wherein:  
the first keyboard segment and the second keyboard segment are  
positionable relative to one another to reduce ulnar deviation of a user's wrists.
32. The keyboard of claim 18, wherein:  
the joint is adapted to allow pivoting of the first keyboard segment and  
the second keyboard segment in both horizontal and vertical directions.
33. A keyboard comprising:  
a first keyboard segment, the first keyboard segment including keys;  
a second keyboard segment, the second keyboard segment including  
keys; and  
a joint coupling the first keyboard segment and the second keyboard  
segment, the joint allowing movement of the first keyboard segment and the  
second keyboard segment relative to one another, the joint including a locking  
mechanism, the locking mechanism locking a position of the first keyboard  
segment relative to the second keyboard segment, the locking mechanism  
including a movable bearing element movable relative to the first keyboard  
segment and the second keyboard segment.



34. The keyboard of claim 33, wherein:  
the movable bearing element has a hemispherical surface.
35. The keyboard of claim 34, wherein:  
the locking mechanism includes a lever movable from a locking position to an unlocking position.
36. The keyboard of claim 33, wherein:  
the locking mechanism includes a cam.
37. The keyboard of claim 36, wherein:  
the cam is connected to the bearing element, movement of the cam causing movement of the bearing element.
38. The keyboard of claim 33, wherein:  
the joint includes a ball, the bearing element engaging the ball in a locked position to lock the first segment relative to the second segment.
39. The keyboard of claim 33, wherein:  
the joint is a ball-and-socket joint.
40. The keyboard of claim 33, wherein:  
the locking mechanism includes a biasing element.
41. The keyboard of claim 33, wherein:  
the joint includes a ball, the ball being affixed to one of the keyboard segments.
42. The keyboard of claim 41, wherein:  
the ball is hemispherical.

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(74) Agents: HANDLER, Edward, J., III et al.; Kenyon &amp; Kenyon, One Broadway, New York, NY 10004 (US)

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(71) Applicant (for all designated States except US): GOLDSTEIN TECHNOLOGY PTY LTD. [AU/AU]; 45 Clarence Street, Sydney, NSW 2000 (AU).

(72) Inventors; and

(75) Inventor/Applicants (for US only): GOLDSTEIN, Mark, B. [AU/US]; Apartment 2E, 525 E. 72nd Street, New York, NY 10021 (US). SKOSKIEWICZ, Andrzej [US/US]; 965 Oak Lane, #3, Menlo Park, CA 94025 (US). JUE, Clifford [US/US]; 111 Ponderosa Court, Santa Cruz, CA 95060 (US). LAW, David, John [GB/US]; 10 Cordova Court, Portola Valley, CA 94028 (US).

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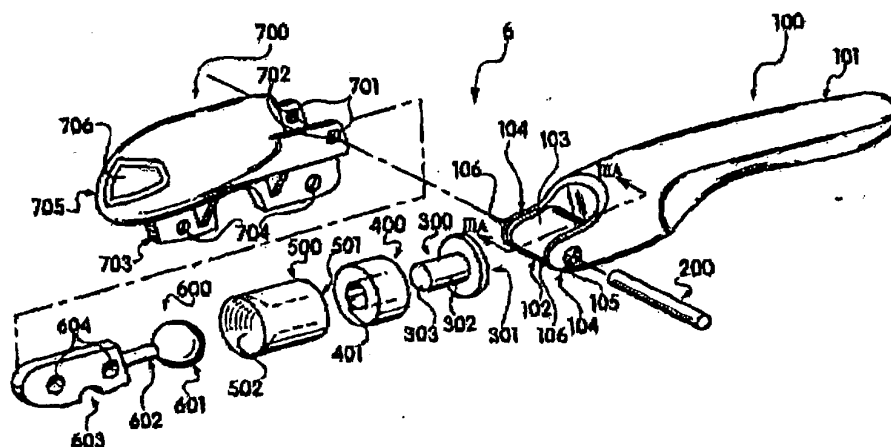
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(54) Title: ADJUSTABLE KEYBOARD WITH ADJUSTING AND LOCKING MECHANISM, AND METHOD OF ITS USE



(57) Abstract: The invention relates to an adjustable keyboard to be used, for example, at a computer terminal (12). The preferred embodiment is in the form of a keyboard having a number of keys (5), the keyboard being formed in at least two segments (2, 3) which are mutually movable relative to one another using a hinge or joint (6). Each of the segments (2, 3) of the keyboard has mounted thereon some of the keys (5). The relatively movable nature of the keyboard aims at reducing stress and discomfort to the user by eliminating contortion to the user's wrists. More particularly, discomfort to the user caused by pronation of the wrists and/or ulnar deviation of the wrists is reduced. The hinge or joint (6) may be in the form of a ball and socket-type joint with a locking mechanism.

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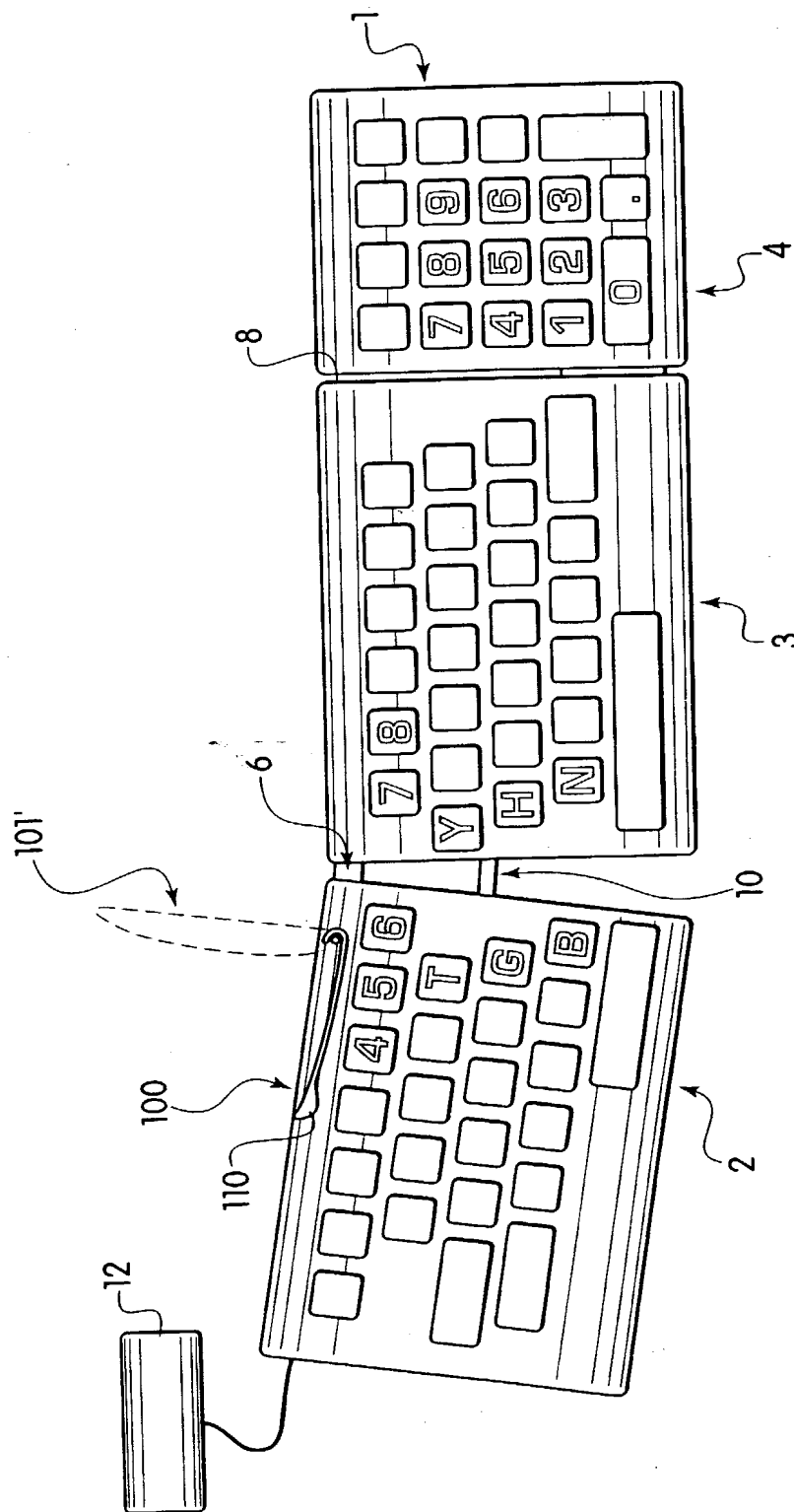
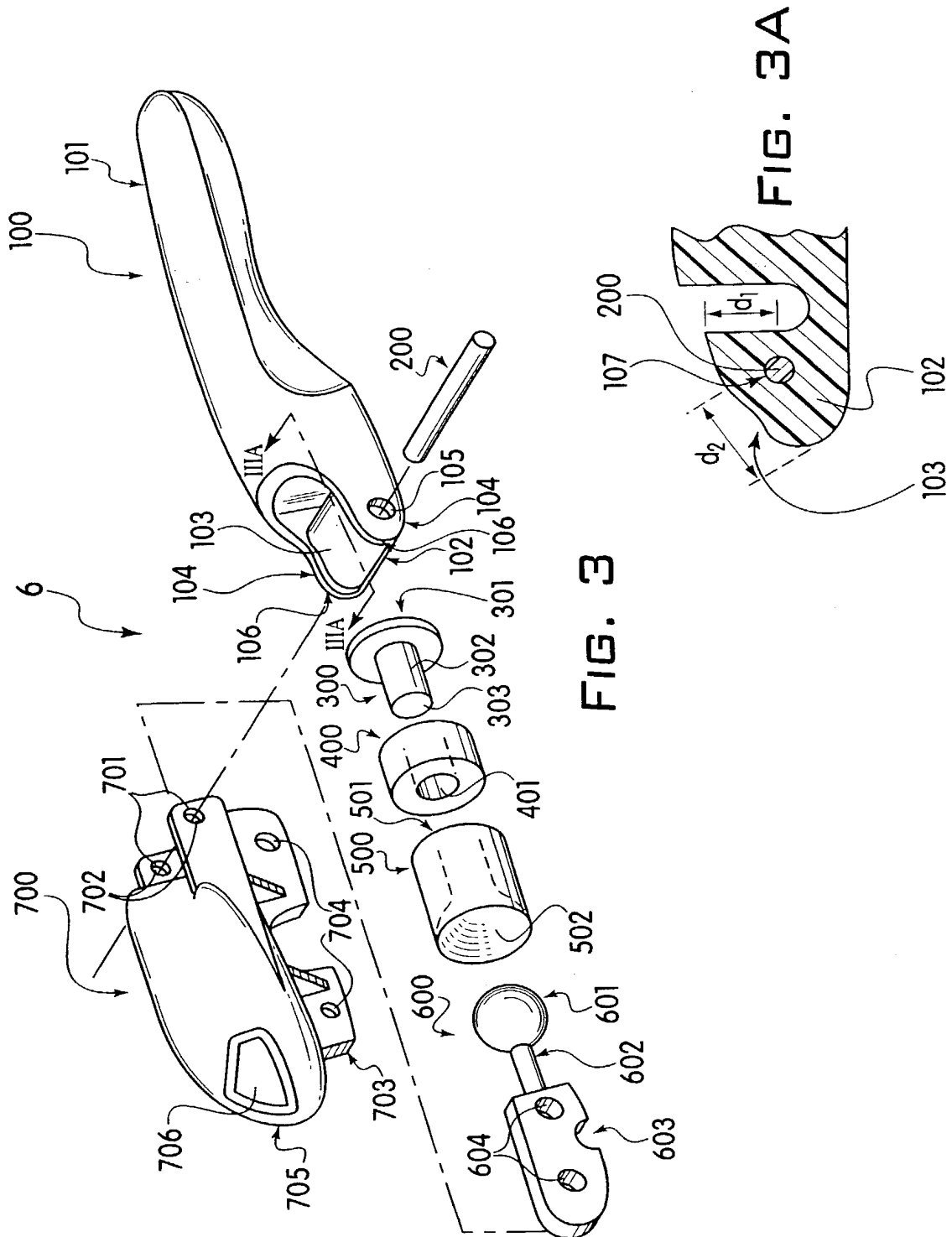


FIG. 1



Fig. 2



U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICE

**DECLARATION**

ATTORNEY'S DOCKET NO.  
1947/27

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am an original, first, and joint inventor of the subject matter that is claimed and for which a patent is sought on the invention entitled **ADJUSTABLE KEYBOARD WITH ADJUSTING AND LOCKING MECHANISM, AND METHOD OF ITS USE**, for which an application for Letters Patent was filed on February 27, 2002 under Serial No. 10/069,587.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56(a).

PRIOR UNITED STATES APPLICATION(S)

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

APPLICATION NUMBER	FILING DATE (day, month, year)	STATUS (i.e. Patented, Pending, Abandoned)
09/384,700	August 27, 1999	Pending

PRIOR FOREIGN APPLICATION(S)

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

APPLICATION NUMBER	FILING DATE (day, month, year)	COUNTRY	PRIORITY CLAIMED

SEND CORRESPONDENCE, AND DIRECT TELEPHONE CALLS TO:

**Laleh Jalali**  
**KENYON & KENYON**  
**1500 K Street, N.W., Suite 700**  
**Washington, D.C. 20005-1257**  
**(202) 220-4200 (phone)**  
**(202) 220-4201 (facsimile)**



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I declare that all statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code and that such willful statements may jeopardize the validity of the application or any patent issuing thereon.

FULL NAME OF INVENTOR <i>LG</i>	FAMILY NAME <b>GOLDSTEIN</b>	FIRST GIVEN NAME <b>Mark</b>	SECOND GIVEN NAME <b>R.</b>
RESIDENCE & CITIZENSHIP	CITY <b>New York</b>	STATE OR FOREIGN COUNTRY <b>New York</b>	COUNTRY OF CITIZENSHIP <b>AUSTRALIA</b>
POST OFFICE ADDRESS	POST OFFICE ADDRESS <b>525 East 72<sup>nd</sup> Street - Apt. 2E</b>	CITY <b>New York</b>	STATE & ZIP CODE/COUNTRY <b>New York 10021</b>
Signature <i>Mark Goldstein</i>		Date <b>7/2/02</b>	
FULL NAME OF INVENTOR <i>LG</i>	FAMILY NAME <b>SKOSKIEWICZ</b>	FIRST GIVEN NAME <b>Andrzej</b>	SECOND GIVEN NAME
RESIDENCE & CITIZENSHIP	CITY <b>Menlo Park</b>	STATE OR FOREIGN COUNTRY <b>California</b> <i>CA</i>	COUNTRY OF CITIZENSHIP <b>USA</b>
POST OFFICE ADDRESS	POST OFFICE ADDRESS <b>965 925 Oak Lane - #3</b>	CITY <b>Menlo Park</b>	STATE & ZIP CODE/COUNTRY <b>California 94301</b>
Signature <i>A. Skoskiewicz</i>		Date <b>7/9/02</b>	
FULL NAME OF INVENTOR <i>LG</i>	FAMILY NAME <b>JUE</b>	FIRST GIVEN NAME <b>Clifford</b>	SECOND GIVEN NAME
RESIDENCE & CITIZENSHIP	CITY <b>Santa Cruz</b>	STATE OR FOREIGN COUNTRY <b>California</b> <i>CA</i>	COUNTRY OF CITIZENSHIP <b>USA</b>
POST OFFICE ADDRESS	POST OFFICE ADDRESS <b>111 Ponderosa Court</b>	CITY <b>Santa Cruz</b>	STATE & ZIP CODE/COUNTRY <b>California 95060</b>
Signature <i>Clifford Jue</i>		Date <b>7/11/02</b>	



FULL NAME OF INVENTOR <i>JL</i>	FAMILY NAME <b>LAW</b>	FIRST GIVEN NAME <b>David</b>	SECOND GIVEN NAME <b>John</b>
RESIDENCE & CITIZENSHIP	CITY <b>Portola Valley</b>	STATE OR FOREIGN COUNTRY <b>California</b> <i>CA</i>	COUNTRY OF CITIZENSHIP <b>United Kingdom</b>
POST OFFICE ADDRESS	POST OFFICE ADDRESS <b>329 MIDDLEFIELD RD</b> <b>10 Cordova Court</b>	CITY <b>PALO ALTO</b> <b>Portola Valley</b>	STATE & ZIP CODE/COUNTRY <b>94301</b> <b>California 94028</b>
Signature <i>[Signature]</i>		Date <b>10 JULY 2002</b>	